

WHAT IS CLAIMED IS:

1. A proportional, pilot-operated flow control valve comprising:
 - a housing, the housing having a chamber and at least one port communicating with the chamber;
 - a cage supported by the housing, the cage having a plurality of cross holes, the cage having an open end, the cage having a stop;
 - a hollow compensating spool slidably disposed within the cage, the spool having a shoulder;
 - a hollow metering guide member slidably disposed within the compensating spool;
 - a regulating spool slidably disposed within the guide member, the regulating spool having a plurality of metering cross holes;
 - a dampening guide slidably disposed inside the compensating spool to define a dampening chamber between the shoulder of the spool and the dampening guide, the dampening guide having a shoulder;
 - a compensating spring disposed inside the dampening chamber and arranged to urge the dampening guide to engage the metering guide and to urge the compensating spool to engage the stop of the cage;
 - a regulating spring disposed inside the regulating spool, the regulating spring being engaged with the cage and urging the regulating spool to abut the shoulder of the dampening guide; and
 - a cartridge, the cartridge having a pilot valve assembly and an adaptor, the adaptor mounted to the cage, the pilot valve assembly mounted to the adaptor, the pilot valve assembly including an actuator.
2. The valve according to claim 1, wherein the actuator is electro-magnetic.
3. The valve according to claim 3, wherein the actuator comprises a solenoid coil.
4. The valve according to claim 1, wherein the actuator is mechanical.
5. The valve according to claim 4, wherein the actuator comprises an adjusting screw.

6. The valve according to claim 1, wherein the valve is a normally-closed type.
7. The valve according to claim 1, wherein the valve is a normally-open type.
8. The valve according to claim 1, wherein the pilot valve assembly comprises a pilot cage, a pilot spool, and a pilot spring, the pilot cage with an axial hole and a plurality of cross holes connected with a groove and facing the pilot spool, the pilot spool including an axial hole and a plurality of cross holes, the pilot spool slidably disposed within the pilot cage, the pilot spring maintaining the pilot spool in an initial defined position.
9. The valve according to claim 8, wherein the housing defines a cavity and the pilot valve assembly defines a pilot cavity, the housing cavity and the pilot cavity connected by at least one hole in the adaptor, a cavity arranged outside of the metering guide shoulder, a groove and a plurality of holes in the hollow cage to a cavity inside of the cage.
10. The valve according to claim 8, wherein the metering guide has a plurality of cross-holes formed therein and an internal groove facing the outside diameter of the regulating spool, and the regulating spool includes a wall with a fixed orifice.
11. A proportional, pilot-operated flow control valve comprising:
 - a cage;
 - a hollow compensating spool slidably disposed within the cage;
 - a hollow metering guide member slidably disposed within the compensating spool;
 - a regulating spool slidably disposed within the guide member;
 - a dampening guide slidably disposed within the compensating spool and defining a dampening chamber therein;
 - a compensating spring disposed within the dampening chamber and configured to urge the dampening guide into engagement with the metering guide and to urge the compensating spool into engagement with the cage;
 - a regulating spring disposed within the regulating spool and configured to urge the regulating spool into engagement with the dampening guide; and
 - a cartridge, the cartridge having a pilot valve and an adaptor, the adaptor mounted to the cage, the pilot valve mounted to the adaptor and the pilot valve including an actuator.

12. A proportional, pilot-operated flow control valve comprising:
 - a regulating spool which is selectively movable over a range of travel between a closed position wherein flow passage through the regulating spool is substantially prevented and an open position wherein full passage is substantially completely allowed, with flow passage being substantially proportionally variable in relation to the position of the spool over the range of travel;
 - a pilot valve operably arranged with the regulating spool to selectively control the position of the regulating spool; and
 - a compensation assembly for maintaining a substantially constant pressure drop across the regulating spool.
13. The flow control valve according to claim 12, wherein the pilot valve comprises a cartridge, the pilot valve being disengageable from the regulating spool.
14. The control valve according to claim 12, further comprising:
 - a dampening guide, the dampening guide cooperating with the compensation assembly to define a dampening chamber.
15. The control valve according to claim 14, wherein the compensation assembly includes a compensating spool and a compensation spring, the dampening guide slidably disposed inside the compensating spool, the compensation spring disposed inside the dampening chamber.
16. The control valve according to claim 15, wherein the compensating spool is movable in response to a source of pressurized fluid such that the compensating spool moves once the pressure exceeds a predetermined amount to allow flow through a bypass passage.